

## REMARKS

### Allowable Subject Matter

Applicants gratefully acknowledge the Examiner's indication that the elected species, claim 19, is allowable. Further, it is noted that claim 18, from which claim 19 depends, also recites that the composition contains thermoplastic fluorinated resin(s).

### Amendments

Claims 23 and 24 are cancelled and replaced by new claims 47 and 48. Claim 47 differs from claim 23 in that the preferred range for  $M_n$  of between 50,000 and 200,000 is recited. New claim 49 is directed to features previously indicated as preferred in claim 23. New claim 50 is dependent on claim 49 and is similar to original claim 24 and new claim 48.

Claims 1, 5-8, 11-22, and 25-31 are amended to delete superfluous language and to use language in accordance with conventional US practice. Aspects that were previously recited as preferred features in claims 8, 11-18, and 20 are recited now recited in new claims 32-46. In addition, claim 1 is amended to recite that when the semi-crystalline thermoplastic resins comprise polystyrene, the block copolymer is a poly(styrene)-poly(butadiene)-poly(methylmethacrylate) triblock copolymer. See, e.g., page 16, lines 25-28. New claim 51 is similar to original claim 1, except that the semi-crystalline thermoplastic resins do not comprise polystyrene. See, e.g., page 16, lines 7-30 and *In re Johnson*, 194 USPQ 187 (CCPA 1977).

### Rejection under 35 USC§112, second paragraph

Claims 1-5, 8-11, 19, 20, 23, 25, 27 and 29-31 are rejected as allegedly being indefinite. This rejection is respectfully traversed.

Contrary to the assertion in the rejection, semi-crystalline is not indefinite, but is a term of art in the field of polymer chemistry. A polymer is semi-crystalline if it exhibits crystalline and amorphous regions. See, e.g., US Patent No. 6,444,283, at column 4, lines 9-16 wherein it is stated:

The term "semi-crystalline" is a term well known in the prior art and is meant to describe a polymer that exhibits X-ray patterns that have sharp features characteristic of crystalline regions and diffuse features characteristic of amorphous regions. As is also known in the prior art, semi-crystalline should

be distinguished from the pure crystalline and amorphous states.

The claims are amended above to remove phrases such as “in particular,” “preferably,” “essentially,” and the like. Many of the features associated with such language are now recited in new dependent claims.

The term oligomer is a term of art and well understood. That a portion of a polymer could be viewed as oligomeric does not make the term indefinite. Further, claims 9 and 10 further describe the oligomer as connecting either block A and block B or block B and block C and as containing at least two different monomers. One of ordinary skill in the art would find this description to be sufficiently definite.

Further, as to nodule size, it is respectfully submitted that this term as used in the claims is sufficiently definite, especially when read in light of the specification. See, e.g., page 18, lines 21-34.

It is respectfully submitted that one of ordinary skill in the art can readily recognize whether a given embodiment falls within or outside the literal scope of the claims. Nothing more is required under the statute. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC§112, first paragraph

Claims 1-5, 8-11, 19, 20, 23-25, 27 and 29-31 are rejected under 35 USC §112, first paragraph. Initially, the rejection alleges lack of written description. However, the arguments seem to be directed more towards an assertion of nonenablement. In any event, applicants respectfully traverse the rejection.

The synthesis of sequential block copolymers is well known within the art. Thus, one of ordinary skill in the art is well aware of the polymerization techniques used to end the formation one block and begin the polymerization of the next block. Similarly, one of ordinary skill in the art knows and understands the procedures that are used provide an intermediate polymerization to form an intermediate structure between two blocks. It is not necessary for a disclosure to disclose processes that are well within the ken of one of ordinary skill in the art. In fact, a specification need not disclose, and preferably omits, that which is well known within the art. See, e.g., *Hybitech Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 649 (Fed. Cir. 1986)

Applicants' specification provides more than sufficient guidance to objectively enable one of ordinary skill in the art to practice the invention with no more than routine experimentation, which is all the statute requires. See, e.g., *In re Marzocchi et al.*, 169 USPQ 367 (CCPA 1971). Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC§102(b)/ §103(a)

Claims 1-5, 8-11, 20, 23, 25, 27 and 29-31 are rejected as being anticipated or obvious in view of the Reiss et al. article. Claim 26 is rejected obvious in view of Reiss et al. These rejections are respectfully traversed.

Reiss et al. at pages 361-362 discuss the morphology of two ternary blends of polystyrene, poly(methyl methacrylate) and a triblock copolymer containing blocks of styrene, isoprene, and methyl(meth)acrylate. The morphology of these blends as shown in Figs. 4 and 5, is similar to morphology S $\alpha$  shown in Fig. 2 at page 359.

Each of these two blends contain 25 % polystyrene, 50% poly(methyl methacrylate) and 25 % of the triblock copolymer. The copolymer used in the blend shown in Fig. 4 contains 28 % styrene, 17% isoprene, and 55% methyl(meth)acrylate and has an M<sub>N</sub> value of 520,000. The copolymer used in the blend shown in Fig. 5 contains 27 % styrene, 16% isoprene, and 57% methyl(meth)acrylate and has an M<sub>N</sub> value of 330,000.

These blends disclosed by Reiss et al. do not anticipate applicants' claimed invention. There is no mention within the article of a triblock copolymer containing blocks of styrene, butadiene, and methyl(meth)acrylate, let alone a blend containing such a copolymer and polystyrene. Nor is there any disclosure of blends of semi-crystalline resin(s) and triblock copolymers which do not contain polystyrene. Similarly, there is no disclosure of a blend of polystyrene and a triblock copolymer wherein the copolymer has an M<sub>N</sub> value of between 50,000 and 200,000.

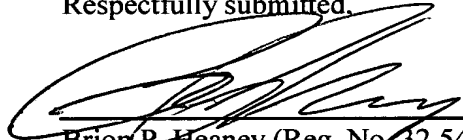
In addition, the disclosure by Reiss et al. provides no motivation that would lead one to modify the two blends disclosed therein in such a manner as to arrive at an embodiment in accordance with applicants' claimed invention. The mere ability, in and of itself, to modify the disclosure of a reference does not establish obviousness. See, e.g., *In re Laskowski*, 10 USPQ2d 1397 (Fed. Cir. 1989). Instead, there must be some motivation provided that leads one of ordinary skill in the art to make the asserted modification. In the present case, no such motivation exists. Nothing in the Reiss et al. article suggests changing the compositions of

the two specific blends. For example, there is nothing to suggest that such modifications will have a morphology that is beneficial. Merely identifying the morphology of one type of blend does not provide motivation to render other blends obvious.

In view of the above remarks, it is respectfully submitted that Reiss et al. fails to anticipate or render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully submitted.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

Respectfully submitted,



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Version With Markings to Show Changes Made

IN THE CLAIMS:

Please cancel claims 23 and 24.

Please amend the claims as follows:

--1. A composition comprising ~~intended to be formed into a material or an item which comprises:~~

- a semi-crystalline thermoplastic resin X1 or several compatible thermoplastic resins X1 to Xn, wherein at least one of X1 to Xn ~~of which~~ is semi-crystalline, and
- at least one block (sequential) copolymer,
- n being an integer equal to or greater than 1,

wherein ~~characterized in that:~~

- the block copolymer comprises at least three blocks A, B and C ~~connected to one another in this order~~, wherein each block is being either a homopolymer or a copolymer obtained from two or more monomers, the A block is being connected to the B block and the B block to is connected to the C block by means of a covalent bond or of an intermediate molecule connected to one of these blocks via a covalent bond and to another block via another covalent bond, ~~and in that:~~

- the A block is compatible with the thermoplastic resin or resins X1 to Xn,
- the B block is incompatible with the thermoplastic resin or resins X1 to Xn and incompatible with the A block,
- the C block is incompatible with the thermoplastic resin or resins X1 to Xn, the A block and the B block,

wherein if the semi-crystalline thermoplastic resins comprise polystyrene, then the block copolymer is a poly(styrene)-poly(butadiene)-poly(methylmethacrylate) triblock copolymer.

5. A composition according to Claim 1 2, wherein the C block has a glass transition temperature Tg(C) or a melting temperature M.t.(C) which is greater than the glass transition temperature Tg(B) of the B block.

6. A composition according to Claim 1, wherein the block copolymer with at least three A, B and C blocks comprises, as side products of its synthesis, a B-C diblock

copolymer and optionally C homopolymer.

7. A composition according to Claim 1, wherein the block copolymer with at least three A, B and C blocks comprises, as side products of its synthesis, an A-B diblock copolymer and optionally A homopolymer.

8. A composition according to Claim 1, wherein the B block is chosen from the group consisting of poly(dienes) , in particular poly(butadiene), poly(isoprene) and their statistical copolymers, or alternatively from and poly(dienes) , in particular poly(butadiene), poly(isoprene) and their statistical copolymers, which are partially or completely hydrogenated.

11. A composition according to Claim 1, comprising:

- from 25 to 95% , ~~advantageously from at least 50% and preferably from 65 to 95%~~ by weight of the thermoplastic resin or resins X1 to Xn, based on the total weight of thermoplastic resin(s) and the block copolymer, and
- the remainder ~~(to 100%)~~ by weight, based on the total weight of thermoplastic resin(s) and the block copolymer, being of the block copolymer comprising the three A, B and C blocks connected to one another, these percentages being calculated with respect to the total weight of thermoplastic resin(s) with the block copolymer, wherein and in that the block copolymer comprises:

- 20 to 93 parts by weight of A sequences
- 5 to 68 parts by weight of B sequences
- 2 to 65 parts by weight of C sequences.

12. A composition according to Claim 1, comprising, by weight:

- at least 50% ~~and preferably from 65 to 95%~~ of poly(carbonate) PC based on the total weight of thermoplastic resin(s) and of the block copolymer, and
- the remainder of the total weight of thermoplastic resin(s) and of the block copolymer being to 100% of the PMMA-PB-PS triblock copolymer;  
~~these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

13. A composition according to Claim 1, comprising , ~~by weight:~~

- at least 50% ~~and preferably from 65 to 95%~~ of poly(carbonate) PC based on the total weight of thermoplastic resin(s) and of the block copolymer, and
- the remainder of the total weight of thermoplastic resin(s) and of the block

~~copolymer being to 100% of the poly(cyclohexyl methacrylate)-PB-PS triblock copolymer, these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

14. A composition according to Claim 1, comprising, by weight:

- at least 50% ~~and preferably from 65 to 95%~~ of poly(butylene terephthalate) PBT based on the total weight of thermoplastic resin(s) and of the block copolymer, and

- the remainder of the total weight of thermoplastic resin(s) and of the block copolymer being to 100% of the PMMA-PB-PS triblock copolymer,

~~these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

15. A composition according to Claim 1, comprising, by weight:

- at least 50% ~~and preferably from 65 to 95%~~ of poly(oxyethylene) POE based on the total weight of thermoplastic resin(s) and of the block copolymer, and

- the remainder of the total weight of thermoplastic resin(s) and of the block copolymer being to 100% of the PMMA-PB-PS triblock copolymer,

~~these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

16. A composition according to Claim 1, comprising, by weight:

- at least 50% ~~and preferably from 65 to 95%~~ of poly(propylene) PP based on the total weight of thermoplastic resin(s) and of the block copolymer, and

- the remainder of the total weight of thermoplastic resin(s) and of the block copolymer being to 100% of the poly(nonyl methacrylate)-PB-PS triblock copolymer,

~~these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

17. A composition according to Claim 1, comprising, by weight:

- at least 50% ~~and preferably from 65 to 95%~~ of poly(amide) PA %, based on the total weight of poly(amide) and the block copolymer, and

- the remainder of the total weight of poly(amide) and the block copolymer being (to 100%) at least one of the poly(caprolactone)-PB-PS triblock copolymer,

~~these percentages being calculated with respect to the total weight of thermoplastic resin(s) and of the block copolymer.~~

18. A composition according to Claim 1, comprising, by weight, at least 50%,

based on the total weight of fluorinated resin(s) and the block copolymer, and preferably from 65 to 95% of semi-crystalline thermoplastic fluorinated resin(s) and the remainder of the total weight of fluorinated resin(s) and the block copolymer being (to 100%) by weight of at least one block copolymer with a number-average molecular mass ( $M_n$ ) of greater than or equal to 20,000 g.mol<sup>-1</sup>, preferably of between 50,000 and 200,000 g.mol<sup>-1</sup>, composed of:

- 20 to 93 and advantageously of 30 to 60 parts by weight of A sequences,
- 5 to 50 and advantageously of 10 to 40 parts by weight of B sequences,
- 2 to 50 and advantageously of 5 to 40 parts by weight of C sequences;

~~the percentages being calculated with respect to the total weight of fluorinated resin(s) with the block copolymer.~~

19. A composition according to Claim 18, wherein said thermoplastic fluorinated resin(s) comprises comprising poly(vinylidene difluoride) (PVDF) as thermoplastic fluorinated resin and said block copolymer is a poly(methyl methacrylate)-poly(butadiene)-poly(styrene) triblock copolymer.

20. A composition according to Claim 1, comprising, by weight, at least 50% and preferably from 65 to 95% of semi-crystalline thermoplastic vinyl resin(s) based on the total weight of vinyl resin(s) and the block copolymer, and the remainder of the total weight of vinyl resin(s) and the block copolymer being (to 100%) by weight of at least one block copolymer with an  $M_n$  of greater than or equal to 20,000 g.mol<sup>-1</sup>, preferably of between 50,000 and 200,000 g.mol<sup>-1</sup>, composed of:

- 20 to 93 and advantageously of 30 to 60 parts by weight of A sequences,
- 5 to 68 and advantageously of 11 to 55 parts by weight of B sequences,
- 2 to 50 and advantageously of 5 to 49 parts by weight of C sequences;

~~the percentages being calculated with respect to the total weight of vinyl resin(s) with the block copolymer.~~

21. A composition according to Claim 20, wherein said semi-crystalline thermoplastic vinyl resin(s) comprises comprising poly(vinyl chloride) (PVC) as semi-crystalline thermoplastic vinyl resin and said block copolymer is a poly(methyl methacrylate)-poly(butadiene)-poly(styrene) triblock copolymer.

22. A composition according to Claim 20, wherein said semi-crystalline thermoplastic vinyl resin(s) comprises comprising chlorinated poly(vinyl chloride) (CPVC) as semi-crystalline thermoplastic vinyl resin and said block copolymer is a poly(methyl



methacrylate)-poly(butadiene)-poly(styrene) triblock copolymer.

25. A composition according to Claim 1, further comprising one or more thermoplastic polymer(s) D which is compatible with the C sequences, wherein said one or more thermoplastic polymer(s) D is being present in an amount of less than 10% of the total mass of thermoplastic resin(s) X1 to Xn and of the block copolymer(s) and, optionally, with, possibly, its side products of the block copolymer.

26. A process for the preparation of a material or of an item from the composition according to claim 1, comprising ~~the following stages:~~

- mixing in a molten state the thermoplastic resin(s) X1 to Xn ~~is (are) mixed in the molten state~~ with the block copolymer(s) and, optionally, at least one ~~the~~ thermoplastic polymer(s) D, and optionally in the presence of additives and/or of fillers which can remain in a solid state,

- cooling the thus obtained liquid or the molten material ~~(optionally with the suspended fillers) thus obtained is cooled to obtain~~ give a material or an item in the solid state.

27. A material or item having a composition according to Claim 1, wherein said material or item has the following characterized by the following specific heterogeneous structure:

- ~~the structure is formed of~~ a continuous phase comprising said (matrix) formed essentially of the thermoplastic resin or resins X1 to Xn, and comprising a non-continuous phase dispersed in ~~a very even manner~~ as nodules with a size Dn of less than 0.5 micrometer micrometre,

- each nodule comprising comprises an internal region comprising composed mainly or essentially of C blocks of the ABC block copolymer(s) and an external peripheral region comprising ~~the B blocks of the ABC block copolymer(s) of the copolymers with at least three A, B and C blocks connected to one another in this order~~, this peripheral region surrounding the internal region in a continuous or discontinuous fashion.

28. A material or item according to Claim 27, wherein the ABC block copolymer ~~with at least three A, B and C blocks~~ comprises, as side products of its synthesis, a B-C diblock copolymer and, optionally, C homopolymer and wherein in that the heterogeneous structure specific to this composition is modified in that the internal region of the nodules, ~~composed mainly or essentially of C blocks~~, surrounds one or more domains comprising

~~composed essentially of B blocks of the B-C diblock.~~

29. A material or item according to Claim 27, wherein the nodules have a size  $D_n$  ranging from 30 to 350 nanometers ~~nanometres~~.

30. A material or item according to Claim 27, wherein the nodules have a size  $D_n$  ranging from 60 to 250 nanometers ~~nanometres~~.

31. A material or item according to Claim 27, wherein the distance between two neighbouring nodules  $D_i$  is between 1.1 and 5 times the value of the size of the nodules  $D_n$ .--